ANSWERS: Polymers

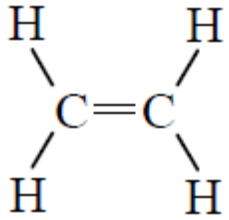
1) The chemical reaction requires heat, high pressure and a catalyst. Many small propene molecules are joined together to form long-chain molecules. The (covalent) double bond between each carbon atom in the propene molecule is broken and a single covalent bond formed between these carbon atoms and between carbon atoms of neighbouring molecules, forming long carbon chains which are the forms of the polypropene molecule. Identified uses are linked to properties such as:

- Low chemical reactivity (eg with air, water and living organisms).
- Insolubility in water.
- Ability to be moulded or extruded into a wide range of shapes with moderate heating.
- Insulator
- Good for ropes used in water, as low density and floats. (*not good for other rope applications as UV degrades it*)
- Recyclable, reshape and use for garden chairs, bins etc.

2) How polyethene is produced:

In a chemical reaction numerous small ethene molecules are joined together to form long-chain molecules. The (covalent) double bond between each carbon atom in the ethene molecule is broken and a single covalent bond formed between these carbon atoms and between carbon atoms of neighbouring molecules, forming long carbon chains which are the backbone of the polyethene molecule. (It would be appropriate for students to draw this using structures such as those drawn in **Appendix B and C.**)

3) A polymer is a long molecule made up of many **repeating** units (**monomers**).
The ethene molecule contains a double bond:



The double bond breaks and single bonds form between the ethene molecules. This is an addition polymerisation reaction. The conditions required include high temperature, pressure and the presence of a catalyst.